Integrated Assessment of Abrupt Climatic Change and Climate Variability

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Outline

- Abrupt climate change
  - Motivation
  - Background
  - Previous research
- Future Research
  - Probability and uncertainty
  - “Dangerous” climate change
  - Methods and analysis

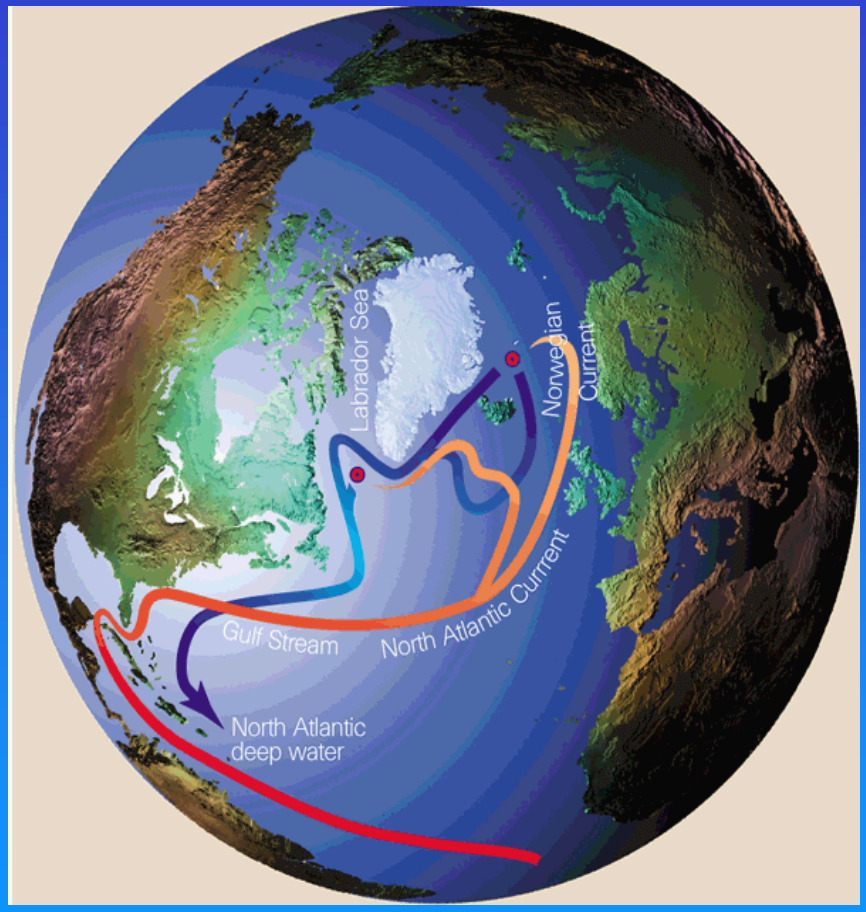
Motivation

- Climate policy debates often focus on generalized warming
- Climate “surprises” or intensified regional climate variability will likely have greater impacts

Motivation

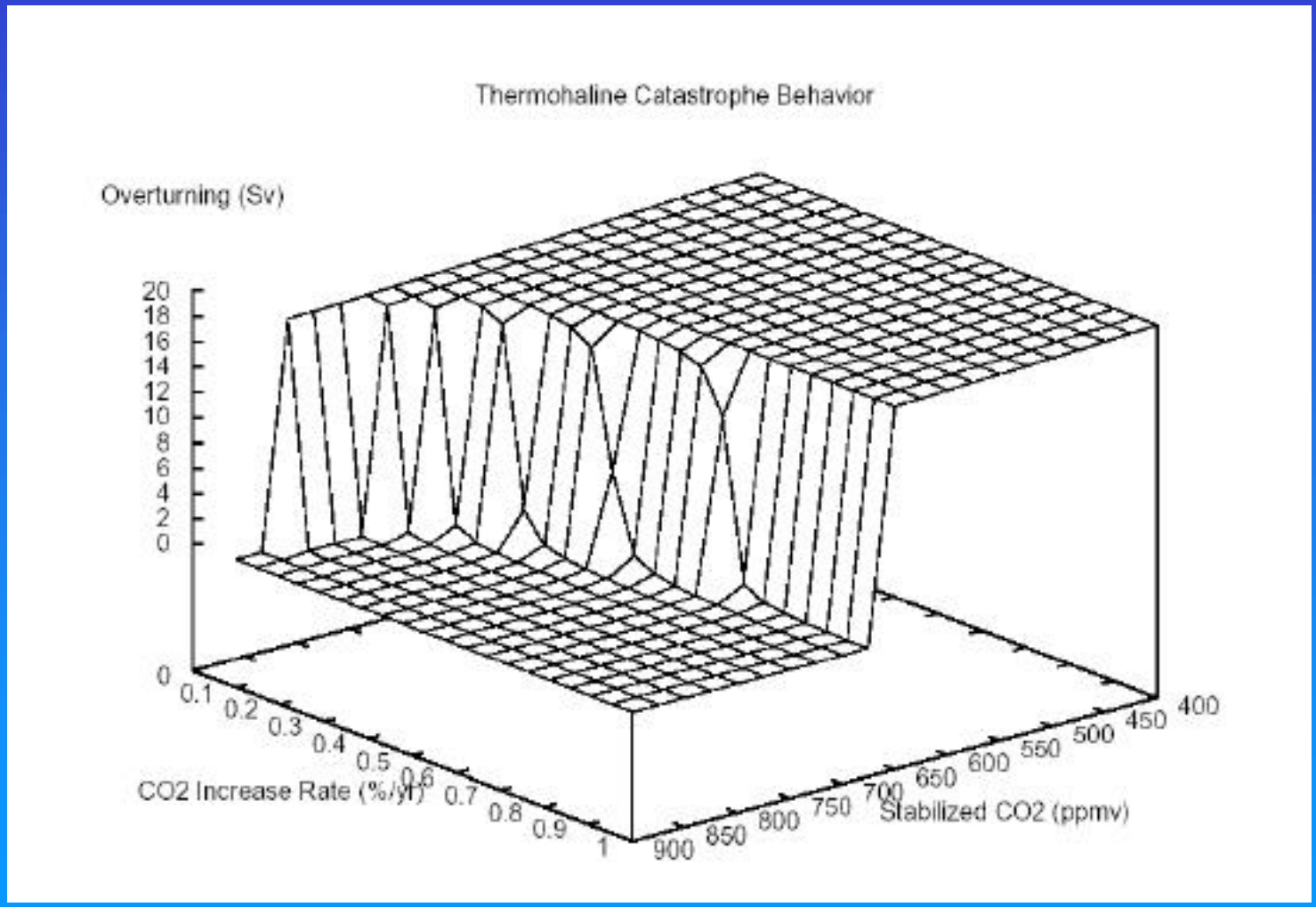
- The Goal: Develop further tools for considering these climate phenomena in integrated assessment

THC Background



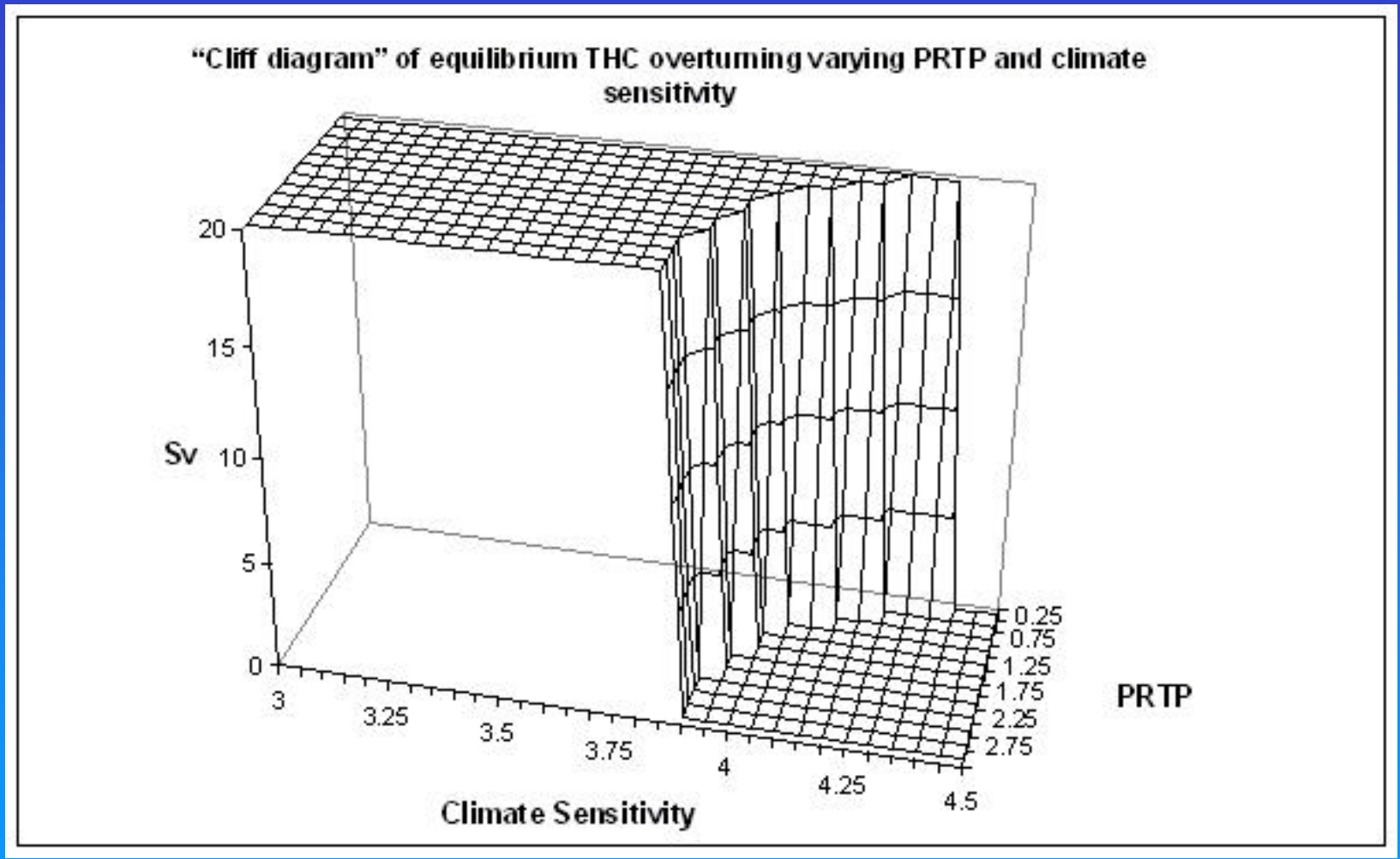
From Rahmstorf, 1999

THC Background



From Schneider and Thompson, 2000

Previous Research



From Mastrandrea and Schneider, 2001

Climate Sensitivity

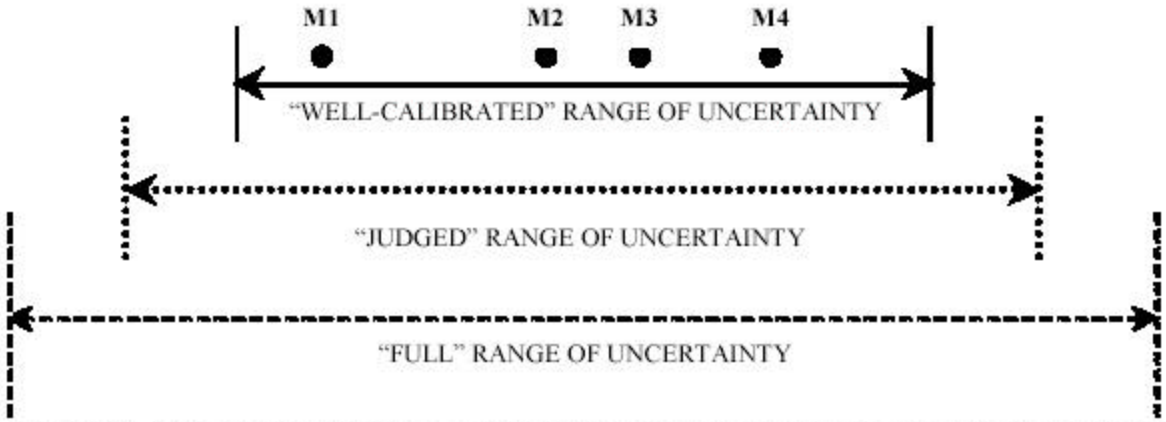
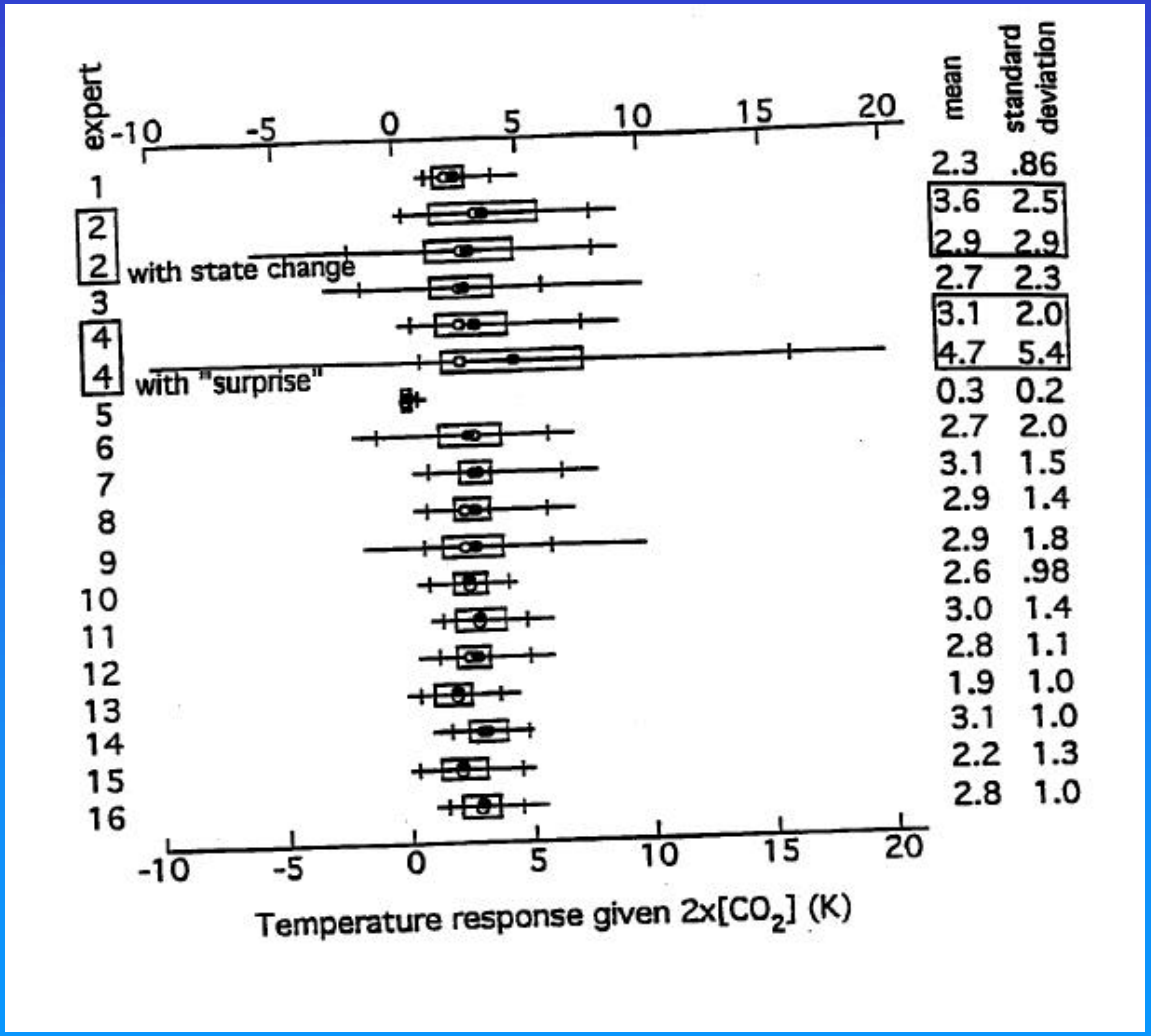


Figure 2. Schematic depiction of the relationship between "well-calibrated" scenarios, the wider range of "judged" uncertainty that might be elicited through decision analytic survey techniques, and the "full" range of uncertainty, which is drawn wider to represent overconfidence in human judgments. M1 to M4 represent scenarios produced by four models (e.g., globally averaged temperature increases from an equilibrium response to doubled CO_2 concentrations). This lies within a "full" range of uncertainty that is not fully identified, much less directly quantified by existing theoretical or empirical evidence[i]. (from Schneider and Kuntz-Duriseti, 2002).

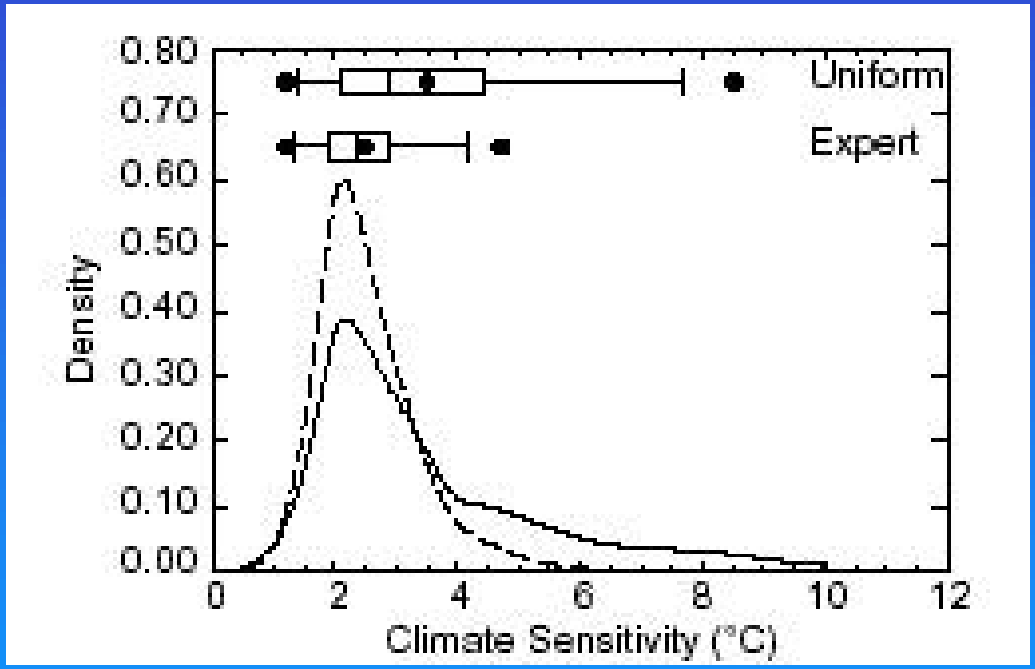
From Schneider and Kuntz-Duriseti, 2002

Climate Sensitivity



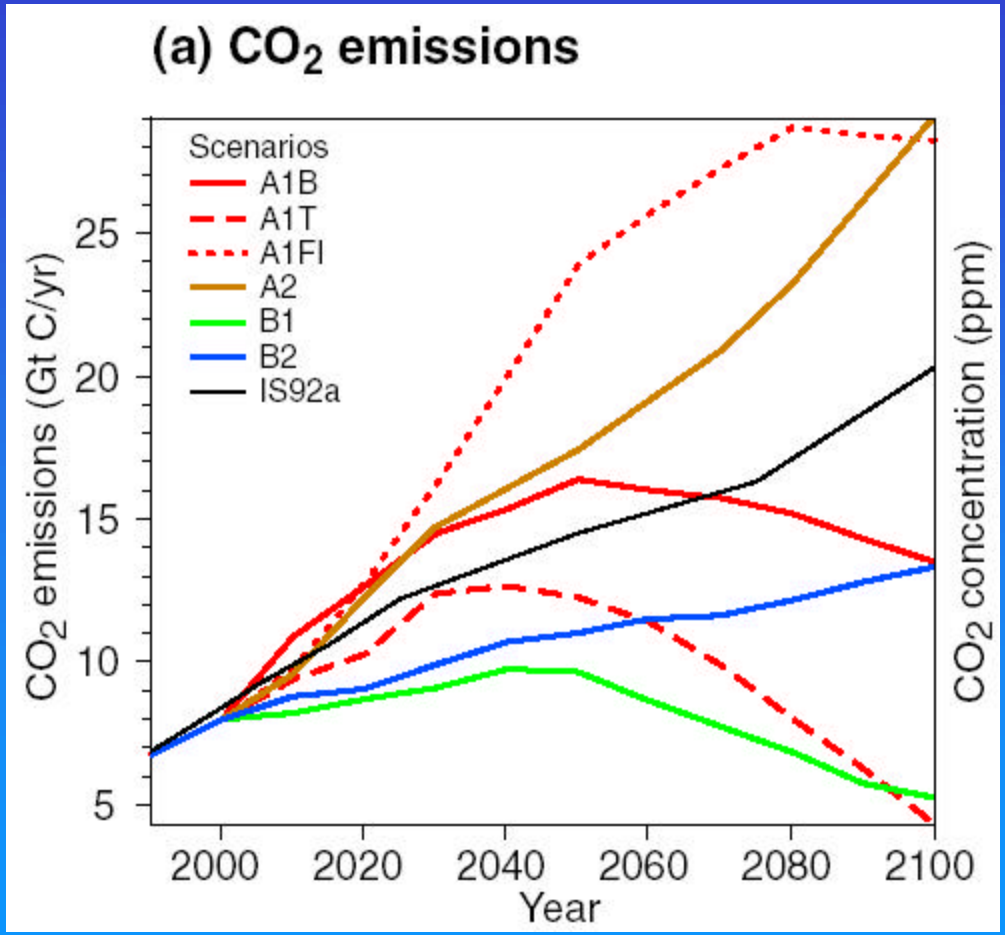
From Morgan and Keith, 1995

Climate Sensitivity



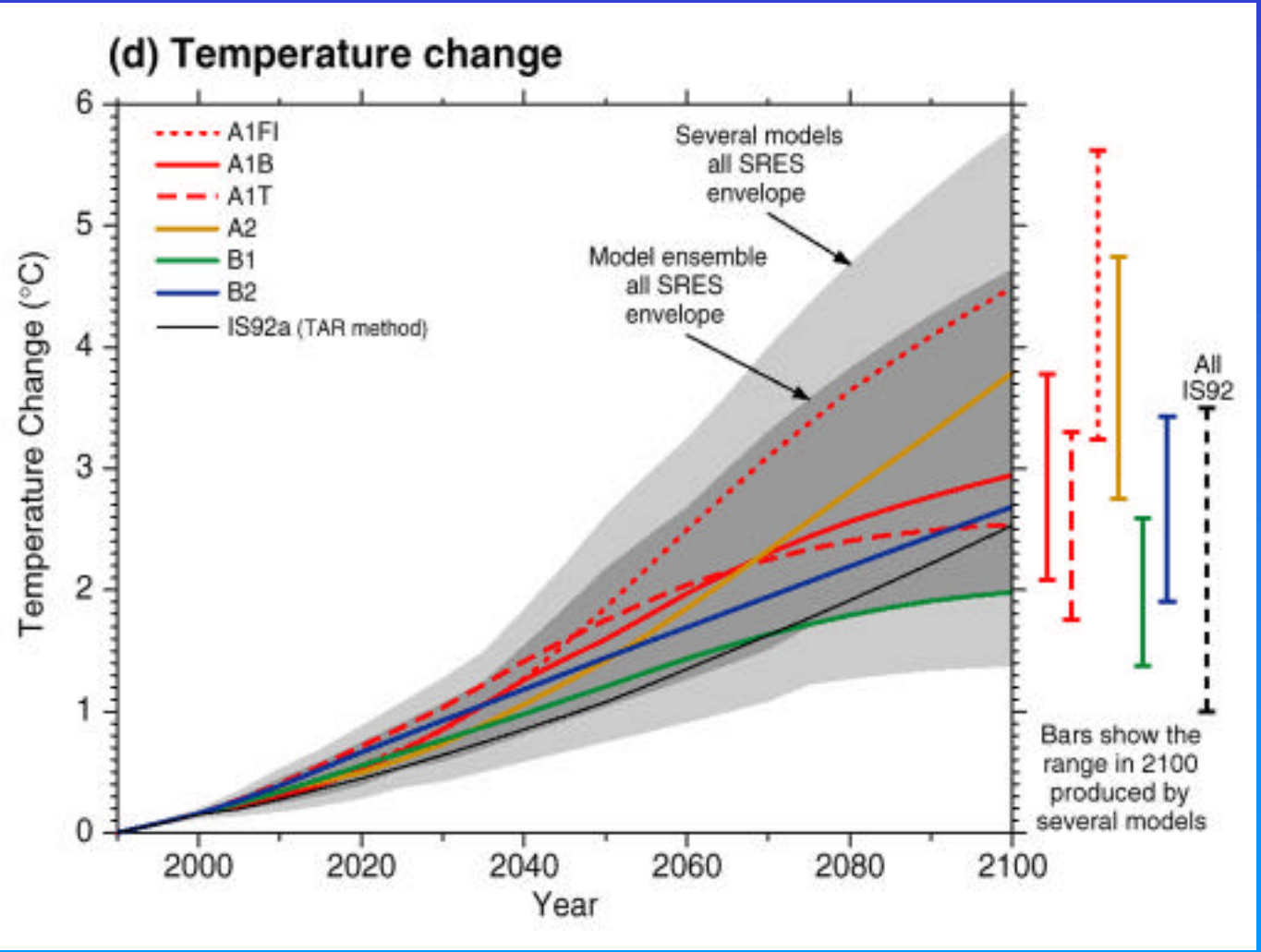
From Forest et al, 2002

SRES



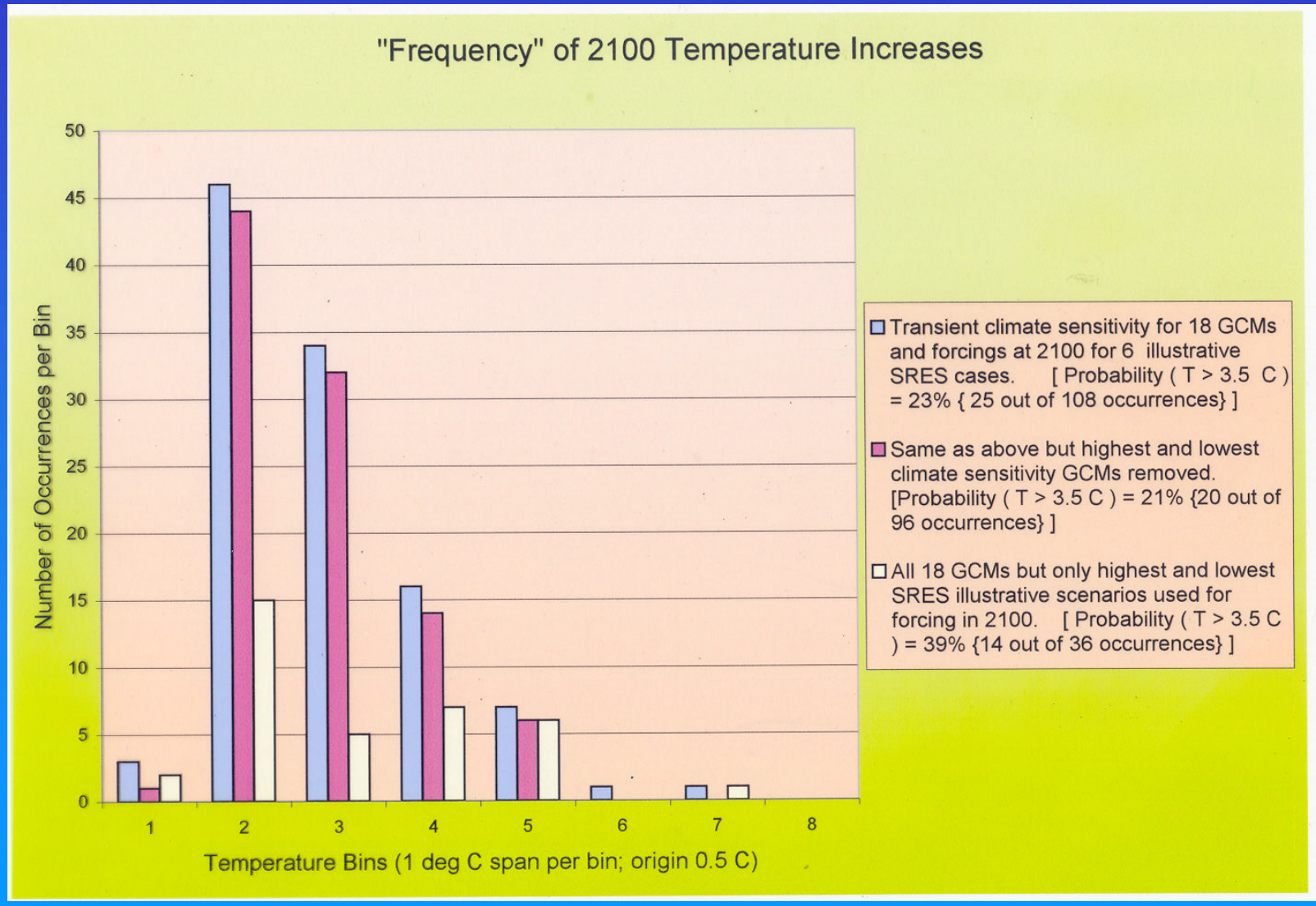
From IPCC, 2001

SRES



From IPCC, 2001

Probability



Future Projects

- Combine distribution of climate sensitivity with IAM to examine the probability of "dangerous" climate change
- Define bounds for probability of THC collapse from probability distributions over SRES families